

BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF SOUTH DAKOTA

In the Matter of the Request for a	)	EL 07-018
Declaratory Ruling by PPM Energy, Inc.	)	
Regarding the Siting of Wind Power	)	<b>AFFIDAVIT OF</b>
Facilities.	)	<b>TIM SECK</b>

State of Minnesota            )  
  )ss  
County of Ramsey        )

COMES NOW Tim Seck , Sr. Wind Project Developer of PPM Energy, Incorporated and for his affidavit states and swears as follows:

1. My name is Tim Seck. I am a resident of Minnesota and an employee of PPM Energy, Inc. I have responsibility for the development of wind energy projects in South Dakota including MinnDakota and Buffalo Ridge I.
2. MinnDakota Wind, LLC and Buffalo Ridge I LLC are both wind development companies developing projects in Brookings County, South Dakota. They are owned by PPM Energy, Inc. which is owned by Scottish Power Holdings, Inc.
3. Both Buffalo Ridge I and MinnDakota are intended to be operated and maintained by PPM Technical Services, LLC.
4. Buffalo Ridge I Wind owns a 55MW conditional use permit from Brookings County, South Dakota. A copy of the permit is on file with the Commission.
5. MinnDakota Wind Project owns a permit for 99 megawatts from Brookings County, South Dakota and a copy of that permit is on file with the Commission as well.
6. The projects occupy different sites both in Brookings County and will have two miles of separation at their nearest wind turbines. Copies of the maps of the projects are on file with the Commission.
7. The electrical out put of the two projects will be sold to different purchasers under separate agreements. The output of MinnDakota is being sold to Xcel Energy and the output of Buffalo Ridge I will be sold to another purchaser.
8. The projects will utilize different turbines, both brands and sizes. MinnDakota uses 1.5MW GE turbines and Buffalo Ridge will use 2.1MW Suzlon turbines. For the first two to

seven years, Suzlon will provide basic warranty and operations and maintenance for the Buffalo Ridge project. After the Suzlon operations and maintenance contract lapses, the projects will likely be maintained by the same operations and maintenance firm.

9. The projects will be individually financed with third party financiers. The financing arrangements are separate with respect to the two facilities. The financing requirements of the financiers are required to be securitized with the assets of the development and necessarily that includes the output from the project as well as the assets both above and below ground. There can be and will be no commingling of the assets or the output from them, in order to satisfy the requirements of the financiers.

10. The projects are separately metered.

11. Both projects will share an interconnect agreement (G255). Despite sharing the interconnect agreement, the electrons from the two projects are not and will not be integrated.

12. The two projects have separate and dedicated collection and feeder lines. However, the feeder lines will share common overhead 34.5 kv transmission structures for approximately five miles with each project having dedicated lines precluding integration of any electrons

Further Affiant saith not.

Dated this 4<sup>th</sup> day of October, 2007.

Tim Seck  
TIM SECK

State of Minnesota                    )  
  )ss  
County of Ramsey                    )

On this the 4<sup>th</sup> day of October, 2007 before me the undersigned, a Notary Public within and for said County and State, personally appeared, Tim Seck, known to me to be the person who is described in and who executed the foregoing instrument and acknowledged to me that he executed the same.



Elizabeth Kathryn Pitzl  
Notary Public  
My Commission Expires: January 31, 2011

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BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

LeRoy Koppendrayner  
David C. Boyd  
Marshall Johnson  
Thomas Pugh  
Phyllis Reha

Chair  
Commissioner  
Commissioner  
Commissioner  
Commissioner

In the Matter of a Site Permit Application  
For the up to 49.9 MW Moraine Wind II  
Project in the Minnesota Counties of  
Pipestone and Murray.

ISSUE DATE: July 31, 2007

DOCKET NO. IP-6632/WS-07-389

FINDINGS OF FACT AND  
CONCLUSIONS AND ORDER

The above-entitled matter came before the Minnesota Public Utilities Commission (PUC or Commission), pursuant to the Application by Moraine Wind II, LLC, for a Large Wind Energy Conversion Site (LWECS) permit to construct, operate, maintain and manage up to a 49.9 Megawatt (MW) combined nameplate capacity wind farm and associated facilities Pipestone and Murray counties, Minnesota. The LWECS site permit is to be issued to Moraine Wind II, LLC.

**STATEMENT OF ISSUE**

Should Moraine Wind II, LLC, be granted a site permit under Minnesota Statutes Chapter 216F to construct and operate up to a 49.9 MW LWECS in Pipestone and Murray counties?

Based upon the record and proceedings created in this proceeding, the Commission makes the following:

**FINDINGS OF FACT**

**Background and Procedure**

1. On April 11, 2007, PPM Energy, on behalf of Moraine Wind II, LLC, filed an application with the PUC for a LWECS site permit to construct, operate, maintain and manage a 49.9 MW combined nameplate capacity wind facility and associated facilities in Pipestone and Murray counties, Minnesota. (Exhibit 1).
2. Comments and Recommendations to the PUC, dated April 26, 2007, the Department of Commerce (DOC) Energy Facilities Permitting (EFP) staff recommended that the PUC accept the application as complete under Minnesota Rule 4401.0450, appoint a public advisor, and make a preliminary determination to issue a draft site permit and approve a draft site permit for the Project. (Exhibit 2).

3. DOC EFP staff published on the PUC Energy Facilities Permitting web page the Notice of Public Information Meeting and the availability of the draft site permit on April 27, 2007.
4. On April 27, 2007, pursuant to Minnesota Rule 4401.0550, the DOC EFP staff mailed the Notice of Public Information Meeting and Public Comment Period to persons on the project mailing list to solicit comments on the site permit application, draft site permit and to review the permitting process for the Moraine Wind II Project. (Exhibit 3).
5. On April 30, 2007, the *Murray County Wheel-Herald* published the Notice of Public Information Meeting as required by Minnesota Rule 4401.0550. On May 1, 2007, the *Marshall Independent* published the Notice of Public Information Meeting as required by Minnesota Rule 4401.0550. On May 3, 2007, the *Pipestone Star* published the Notice of Public Information Meeting as required by Minnesota Rule 4401.0550. (Exhibits 4, 6 and 8).
6. On May 1, 2007, HDR Engineering, on behalf of Moraine Wind II, LLC, distributed copies of the site permit application and Notice of Public Information Meeting by U.S. Mail to each landowner within the Project boundary, as well as, township, county and other required governmental officials. Minnesota Rule 4401.0460. (Exhibit 5).
7. On May 3, 2007, the PUC issued its Order accepting the application as complete and issuing a draft site permit for the Project. (Exhibit 7).
8. On May 7, 2007, Notice of Public Information Meeting and Public Comment Period was published in the *EQB Monitor*, Volume 31, No. 10. The published notice contained all of the information required by Minnesota Rule 4401.0550 subp. 1. (Exhibit 9).
9. The DOC EFP staff held a public information meeting on May 15, 2007, in Lake Wilson, Minn., as required by Minnesota Rule 4401.0550 to describe the Project, the permitting process and to take public comments. Approximately 40 people attended the meeting. DOC EFP staff provided an overview of the permitting process, the draft site permit and responded to questions about the permitting process. Representatives from PPM Energy reviewed the proposed Moraine Wind II Project and responded to questions.
10. The public comment period closed on June 6, 2007. Four written comments were received and are discussed in Findings 29 – 33. (Exhibit 10).

### **The Permittee**

11. Moraine Wind II, LLC, is the Permittee and will be responsible for development, management, procurement, construction, commissioning, operation, and long-term ownership of the Project. Moraine Wind II, LLC, will own the Project including all equipment up the interconnection to the high voltage transmission system at the existing Xcel Energy Chanarambie Substation.

## Project Description

12. The application provides a preliminary layout and site plan, which is subject to change. (Exhibit 1).
13. The proposed Project will use between 16 – 33 utility scale wind turbine generators between 1.5 MW and 3.0 MW in nameplate capacity for a combined nameplate capacity of up to 49.9 MW. The wind turbines will be between 80 – 105 meters (m) in hub height and will use rotors between 78 – 100 m in diameter. (Exhibit 1).
14. Most of the land within the Project site is actively farmed. Cultivated lands make up nearly all of the Project area with the exception of several areas managed for conservation. (Exhibit 1).
15. The Project boundary as proposed includes approximately 27,000 acres in the townships of Aetna, Ellsborough, Rock, Cameron and Chanarambie in Pipestone and Murray counties. PPM Energy estimates that the proposed facilities will result in the permanent, direct disturbance of 16 - 27 acres of land depending on turbine model, size and final site layout. (Exhibit 1).
16. All wind turbines, towers and blades under consideration will be in a neutral, off-white color. (Exhibit 1).
17. The Project will include an underground-automated supervisory control and data acquisition system (SCADA) for communication purposes. Temporary meteorological towers will be removed from the site no longer than one year after the Project in-service date. One permanent meteorological tower is permitted and will be used as part of the SCADA system. Other associated facilities will include a concrete and steel foundation for each tower, pad-mounted step-up transformers, electrical junction boxes, all weather class 5 roads of gravel or similar material, a project substation, and an underground and overhead 34.5 kilovolt (kV) electric energy feeder and collection system. (Exhibit 1).
18. Each tower will be secured by a concrete foundation that will vary in size and design depending on site soil conditions. A control panel that houses communication and electronic circuitry is placed in each tower. A step-up, pad-mounted transformer will be located adjacent to each turbine to collect the power from the turbine and transfer it to a 34.5 kV collection system via underground and overhead cables. (Exhibit 1).
19. Each turbine will be interconnected through an underground electrical collection and feeder system at 34.5 kV. The Permittee will place the 34.5 kV collection and feeder lines primarily on private rights-of-way and limit use of public rights-of-way. Feeder lines may be underground or overhead depending on local conditions. All of the proposed collection and feeder lines would connect to a new Project substation developed exclusively for the Moraine Wind II Project or to an expansion of an existing substation in the area. Electricity collected from the 34.5 kV collection system will be delivered to and stepped up to 115 kV at the Xcel Energy Chanarambie Substation. (Exhibit 1).

20. Each wind turbine will be interconnected with fiber optic communication cables that will be installed underground. The communication cables will run to a central host computer which will be located either at the Project substation or at the operations and maintenance facility where a SCADA system will be located. Signals from the current and potential transformers at each of the delivery points will also be fed to the central SCADA host computer. The SCADA system will be able to give status indications of the individual wind turbines and the substation and allow for remote control of the wind turbines locally or from a remote computer. The SCADA system will provide detailed operating and performance information for each wind turbine. The Permittee will maintain a computer program and database for tracking each wind turbine's maintenance history and energy production. The PUC will have viewer access to the SCADA system. (Exhibit 1).

### **Wind Resource Considerations**

21. The Moraine Wind II, LLC, Project will be located in Pipestone and Murray counties between approximately 1,700 – 2,000 feet above sea level. Land use in the area is agricultural with intensive farming activities and, as a result, there are few trees or structures in the proposed site to inhibit the wind as it passes over the site. (Exhibit 1).
22. The wind resource in the Project area is well documented by the Applicant and the Department of Commerce. Wind Resource Maps produced in 2006 by WindLogics for the Department of Commerce indicate that the resource in the vicinity of the project area at 80 meters (263 feet) is between 8.1 – 8.9 meters per second (18.1 – 19.9 miles per hour). (Exhibit 1).
23. For the Moraine Wind II Project, wind turbines are sited so as to have good exposure to winds from all directions with emphasis on exposure to the prevailing southerly and northwesterly winds. The turbine spacing, according to site permit application, will maximize use of the available wind and minimize wake and array losses within the topographical context of the site. Turbine placement has been designed to provide a minimum of 3 rotor diameter spacing in the east-west direction and 5 rotor diameter spacing in the north-south direction, with respect to the predominant energy production directions. Given the prevalence of southerly and northwesterly winds, the spacing is widest in the north-south direction. Greater spacing between the turbine strings may be used in areas where the terrain dictates the spacing. This is addressed in the permit at III.E.5. Individual, isolated turbine sites are avoided to minimize interconnection and access costs. Sufficient spacing between each turbine is utilized to minimize wake losses when the winds are blowing parallel to the turbine rows. (Exhibit 1)
24. PPM Energy estimates that the Moraine Wind II Project average annual output will be approximately 153,000 – 196,700 megawatt hours (MWh) per year. Final Project output is subject to final layout, design, equipment selected and wind resources. (Exhibit 1).

### **Land Rights and Easement Agreements**

25. In order to build a large wind energy conversion system, a developer needs to secure wind rights, site leases and easement option agreements to ensure access to the site for construction and operation of a project. These lease or easement agreements generally

also prohibit landowners from undertaking any activities that might interfere with execution of a proposed project.

26. PPM Energy and Moraine Wind II, LLC, have obtained lease and easement option agreements with landowners for approximately 17,000 acres of land and wind rights within portions of the Project site boundary necessary for installation of the components of the wind farm. Moraine Wind II, LLC, may develop its facilities on lands within the Project boundary where it holds or acquires development rights, subject to permit conditions. (Exhibit 1).
27. The wind access buffer set-back of 3 RD on the east-west (cross-wind) axis and set-back of 5 RD on the north-south (down-wind) axis have been established to protect the wind rights of adjacent landowners or others not participating in the Moraine Wind II, LLC, Project.
28. The Permittee will be required to meet the 3 RD east-west and 5 RD north-south wind turbine set-backs from properties outside of the Project boundary described in the application and from properties inside the boundary for which PPM Energy or Moraine Wind II, LLC, do not hold wind development easements or rights. (Exhibit 1).

#### **Public Comments and Letters Received**

29. Verbal comments at the May 15, 2007, public meeting were supportive of the Moraine Wind II Project. Questions about the Project and permitting process included noise, archeological and cultural resource surveys, drain tile, wind easement payments, and locations of turbines proposed.
30. On June 1, 2007, Paul White of Project Resources Corporation, a wind development company, submitted comments on the Moraine Wind II Project. Mr. White requested that the previously permitted Ridgewind Power Partners, LLC, Project boundary, reviewed in PUC Docket IP6603/WS-06-1327, be excluded or removed from the Moraine II Project boundary. (Exhibit 10).
31. On June 1, 2007, the Southwest Regional Development Commission submitted comments indicating that Moraine Wind II has covered all aspects required for a site permit and did not raise any concerns about the Project. (Exhibit 10).
32. On May 29, 2007, the Minnesota Department of Transportation (MDOT) District 8 submitted a comment requesting that wind turbine generators be set back from public road rights of way a distance greater than the overall height of the wind turbines, including blades. This issue is addressed in Finding 35, 36 and 39. (Exhibit 10).
33. On June 4, 2007, PPM Energy submitted comments suggesting several clarifications and two substantive changes to the draft site permit. First, PPM Energy requested that permit condition III.B.12 be amended to allow the Permittee up to eight months after completing construction of the entire Project rather than eight months after completion of construction of each individual turbine to restore any disturbed lands to their original preconstruction conditions. Second, PPM Energy indicated that while it plans on avoiding wetlands, it

requests the flexibility to place some 34.5 kV collection line poles in wetlands if unavoidable. (Exhibit 10). This issue is addressed in Finding 69.

### **Site Criteria**

34. Minnesota Statutes Chapter 216F and Minnesota Rules Chapter 4401 apply to the siting of Wind Energy Conversion Systems. The rules require applicants to provide a substantial amount of information to allow the PUC to determine the potential environmental and human impacts of the proposed project and whether the project is compatible with environmental preservation, sustainable development, and the efficient use of resources. Minnesota Rules 4401.0450 and 4401.0600. The following analysis addresses the relevant criteria that are to be applied to a LWECS project.

### **Human Settlement, Public Health and Safety**

35. Nearly the entire Project area is zoned for agricultural use by Pipestone and Murray counties. The Project area is low in population density, with little residential, commercial or industrial development on or near the site. As a result, the impact of the proposed LWECS on human settlement, public health and safety can be avoided. Permit condition III.C. specifies conditions for setbacks from residences and roads.
36. In winter months ice may accumulate on the wind turbine blades when the turbines are stopped or operating very slowly. Furthermore, the anemometer may ice up at the same time, causing the turbine to shut down during any icing event. As weather conditions change, any ice will normally drop off the blades in relatively small pieces before the turbines resume operation. This is due to flexing of the blades and the blades' smooth surface. Although turbine icing is an infrequent event and has not been identified as a safety hazard to date in Minnesota, it remains important that the turbines are not sited in areas where regular human activity is expected below the turbines or in the immediate proximity during the winter months. See site permit condition III.C. requiring a 500 foot minimum setback from residences and a 250 foot setback from public road rights-of-way.
37. There will be no displacement of existing residences or structures in siting the wind turbines and associated facilities. (Exhibit I).
38. The Permittee is required to comply with the Federal Aviation Administration (FAA) requirements with respect to turbine lighting, marking and aviation safety. See site permit condition III.E.4.
39. Moraine Wind II, LLC, is required to provide security during construction and operation of the Project, including fencing, warning signs, and locks on equipment and facilities. Moraine Wind II, LLC, will also provide landowners and interested persons with safety information about the Project prior to construction. See site permit conditions III.B.15-16.
40. Each wind turbine will be clearly marked to identify each unit and a map of the site shall be provided to local public safety authorities. The site permit requires the Permittee to

prepare a fire protection and medical emergency plan in consultation with the local fire department prior to construction. See site permit conditions III.B.15 - 17.

## Noise

41. Wind turbines generate noise. The Permittee is required to meet the Minnesota Noise Standards applicable to residential receivers. The Minnesota Noise Standards are enforced by the Minnesota Pollution Control Agency (MPCA) and are found in Minnesota Rule 7030.0040. See site permit condition III.E.3.
42. The site permit requires that wind turbine generators are sited at least 500 feet from occupied dwellings and at a sufficient distance from residential receivers to ensure the Project meets the requirements of the Noise Standards in Minnesota Rules Chapter 7030. See site permit condition III.E.3.
43. In its Application, Moraine Wind II, LLC, provides sound power levels and estimated distances needed from residential receivers to meet the Minnesota Noise Standards for each wind turbine model under consideration for the Project. Final wind turbine placement will take into account the locations of residential receivers during the micrositing process to ensure compliance with Minnesota Noise Standards. (Exhibit 1). See site permit condition III.E.3.

## Visual Values

44. Wind turbines, towers and rotor blades have visual impacts. The visual impacts of wind facilities are highly subjective. Some people like the view of wind turbines, others do not. The Moraine Wind II Project will be visible to area residents and passing motorists on local, county and state highways. (Exhibit 1).
45. Wind turbines, towers and rotor blades are currently prominent features on the landscape adjacent to the proposed Project site and on the Buffalo Ridge generally. There are currently expansive views of turbines to passing motorists on local, county and state highways, to rural residents and to residents in Lake Wilson and Woodstock. (Exhibit 1).
46. The visual impact of the proposed Moraine Wind II, LLC, wind turbines will be reduced by the use of a neutral paint color. The only lights permitted will be those required by the FAA. See permit condition III.E.4. All site permits issued by the PUC require the use of tubular towers; therefore, the turbine towers will be uniform in appearance. Wind turbines are and will continue to be a dominant visual feature on the landscape on and near the Buffalo Ridge. The wind turbines in this Project, while prominent on the landscape, will also blend in with the surrounding area. The site will retain its rural character. The turbines and associated facilities necessary to convert the wind for energy are consistent with existing land use, wind energy production, and agricultural practices. (Exhibit 1).
47. The numerous wind farms on the Buffalo Ridge have altered the landscape from agricultural to wind plant/agricultural. The Project will incrementally increase the visual impact to the area. The cumulative effect of the proposed Project will increase both the

industrial appearances of the wind plants in the area and the areas from which they will be seen. Because wind generation development is likely to continue in Pipestone and Murray counties, this visual impact will continue to increase the size of the wind plant/farm footprint as the turbines harvest the wind resources of the area for energy. To date the presence of numerous wind turbines on Buffalo Ridge has been well accepted by the people who live and work in the area.

48. Moraine Wind II, LLC, use of larger turbine rotor sizes and rotor diameters will result in greater turbine spacing to minimize wake loss. Therefore the Moraine II turbines will be spaced further from one another and existing turbines than in several older, existing projects on Buffalo Ridge several of which used smaller turbine rotors and rotor diameters. See site permit condition III.C.

### **Recreational Resources**

49. Recreational opportunities in Pipestone and Murray counties include: hunting, fishing, snowmobiling, bird and wildlife watching, campgrounds and trails. Hunting, fishing and wildlife observation is permitted in designated Minnesota Department of Natural Resources Wildlife Management Areas (WMA's), Fish and Wildlife Service lands and other lands inside and outside of the Project boundary, in public waters, and on private property in the area unless otherwise posted. There are six designated state WMAs located within the Project boundary, and four WMAs within one mile of the Project boundary. The proposed Project will not impact public access to public waters in the area. (Exhibit 1).
50. The proposed turbines will be visible to persons using the lands inside and close to the Project area. Turbines will not be located on public lands, WMA's, Scientific and Natural Areas or in any local parks. There are no designated SNAs or public parklands within the Project boundary. Wind turbine operations are not expected to affect the natural areas in any material way and no adverse impact on wildlife areas is expected. (Exhibit 1).

### **Facilities**

51. The Moraine Wind II Project is expected to have a minimal effect on the existing facilities. The Project will use underground or overhead cables for the collector lines primarily on private property within the wind farm. The feeder lines associated with the Project may be overhead or underground, dependant on site conditions. Any above ground feeder lines, if used, would be wood or steel poles typical of wind project feeder lines used in other wind projects in Minnesota. The feeder lines will deliver the energy from the wind farm to the Project substation on a route on public road rights-of way, on private land easements or a combination thereof. (Exhibit 1). See site permit at III.E.7. and 8.
52. The Project will require the use of public roads to deliver construction supplies and materials to the work site. Construction of turbine access roads will be located primarily on private property. The access roads will be routed in a manner that minimizes disturbance of agricultural activities while maintaining a short, direct route. The typical permanent access road will be 16 feet in width and covered in Class 5 gravel (or similar material). The access roads will be low profile roads to allow for the movement of

- agricultural equipment. See site permit at III.B. 8 (b). During operation and maintenance of the wind plant, operation and maintenance crews, while inspecting and servicing the wind turbines, will use the access roads. Periodic grading or other methods are necessary to maintain road integrity. The Permittee may do this work or contract it out. (Exhibit 1).
53. The Moraine Wind II Project is not expected to affect railroads, telecommunication facilities, and radio reception. The presence or operation of the wind plant could potentially impact the quality of television reception in the area. Previous work on television reception issues indicates that in some cases new antennas or relocation of existing antennas can restore television signal strength reception. The Permittee is required to initiate a study to assess the strength of communications and television reception in the Project area before project construction to document and mitigate any impacts that might occur. The Permittee shall be responsible for alleviating any disruption or interference to communications systems caused by the turbines or associated facilities. See site permit at III.D.3.
54. Construction, operation, and maintenance of the proposed wind plant shall comply with all of the required federal and state permit requirements. See site permit at III.J.2-3 and III.K.7.
55. If access roads must be installed across waterways that are considered public waters, the Permittee in consultation with the Minnesota Department of Natural Resources will design, shape and locate the road so as not to alter the original water flow or drainage patterns. Any work required below the ordinary high water line, such as road crossings or culvert installation, will require permits from the Minnesota Department of Natural Resources, as well as, consultation with the U.S. Fish and Wildlife Service. See site permit at III.B.8., III.C.5., III.J.3 and III.K.7.

### **Community Benefits**

56. The Moraine Wind II Project will provide local tax revenues from a production tax on the wind energy produced by the turbines. Minnesota Statute 272.028 - 272.029. No significant adverse impact on public services is expected. Wear and tear on roads will occur as a result of the transport of heavy equipment and other materials, and the Permittee is responsible for any necessary repairs. See site permit at III.B.8. Landowners with turbine(s) or associated facilities on their property will receive payments from Moraine Wind II, LLC, for wind rights and land easements.
57. To the extent that local workers and local contractors are capable, qualified, and available, Moraine Wind II, LLC, may hire them to construct the Project. The hiring of local people will expand employment opportunities in this area of the state and keep money in the local economy. Once constructed, the Project will be staffed with site technicians and a wind plant supervisor. Short term construction spending will provide local economic benefits. Long term operations, maintenance, production taxes, and lease payments will also have positive local economic benefits. (Exhibit 1).

## **Effects on Land-Based Economies**

58. The Project will permanently displace approximately 16 - 27 acres of agricultural land. Site permit conditions III.B. 2., 3., 4., 5., 6., 7., 8(c), 9., and 10 address mitigation measures for agricultural lands. The Project does not affect any sand or gravel operations. (Exhibit 1).

## **Archaeological and Historical Resources**

The Moraine Wind II, LLC, site permit Application indicate that the Applicant has consulted with and reviewed the Minnesota State Historic Preservation Office (SHPO) computer database and previous cultural <sup>resources</sup> investigations for the Project area, which indicate that numerous historic structures and archaeological resources have been documented inside the boundaries of or within 1 mile of the Project. Moraine Wind II, LLC, will conduct a cultural resources field survey of all the proposed turbine locations, access roads, and other construction elements to document any previously unrecorded archaeological sites within the site. The site permit at III.D.2. requires Moraine Wind II, LLC, to consult with the SHPO upon completion of cultural resources surveys. (Exhibit 1).

59. If any archaeological sites are found during surveys or construction, their integrity and significance would be addressed in terms of the site's potential eligibility for placement on the National Register of Historic Places (NRHP). If such sites are found to be eligible for the NRHP, appropriate mitigation measures will be developed in consultation with SHPO, the State Archaeologist, and consulting American Indian communities. The site permit also requires the Permittee to stop work and notify the Minnesota Historical Society and PUC if any unrecorded cultural resources are found during construction. See the site permit at III.D.2. (Exhibit 1).

## **Animals and Wildlife**

60. Moraine Wind II, LLC, has consulted with the Minnesota Department of Natural Resources (DNR) and the U.S. Fish and Wildlife Service (FWS) about the Project's design and mitigation measures on natural communities, fish and wildlife. The DNR Natural History Database was reviewed to determine if any rare plant or animal species are known to occur within the Project boundary. The DNR indicated that 4 known occurrences of rare or protected species within 1 mile of the project boundary. Two of the species have not been recorded in the area for over 30 years. One native prairie on railroad right-of-way and one colonial waterbird nesting site have been identified and recorded within one mile of the Project boundary. The DNR indicated that the Moraine Wind II Project will not affect these rare natural resources. (Exhibit 1).
61. The Topeka Shiner, a species of endangered fish, and federally designated critical habitat may be present in streams within the Project boundary. Best management practices shall be implemented to minimize impacts to Topeka Shiner habitat and are attached to the site permit. See site permit at III.M.2.

62. The site permit prohibits placement of wind turbines and associated facilities in native prairie, unless addressed in the prairie protection and management plan submitted to the Minnesota DNR and PUC. See site permit at III.C.6.
63. Neither construction nor operation of the project is expected to significantly impact wildlife. Based on studies of existing wind power projects in the United States and Europe, the only impact of concern to wildlife would primarily be to avian and bat populations. The final report on avian monitoring studies at Buffalo Ridge, Minnesota "Final Report-Avian Monitoring Studies at the Buffalo Ridge, Minnesota Resource Area: Results of a 4-Year Study" (September 2000) identified the following impacts:
- a) Following construction of the wind turbines, there is a reduction in the use of the area within 100 meters of the turbines by seven of 22 species of grassland breeding birds. It was hypothesized that lower avian use may be associated with avoidance of turbine noise, maintenance activities, and less available habitat. The researchers stated "on a large scale basis, reduced use by birds associated with wind power development appears to be relatively minor and would not likely have any population consequences on a regional level." (p. 44)
  - b) Avian mortality appears to be low on Buffalo Ridge, compared to other wind facilities in the United States, and is primarily related to nocturnal migrants. Resident bird mortality is very low and involves common species. The researchers stated that "based on the estimated number of birds that migrate through Buffalo Ridge each year, the number of wind plant related avian fatalities at Buffalo Ridge is likely inconsequential from a population standpoint." (p. iv)
64. Bat mortality was also studied at Buffalo Ridge, instigated by bat collision victims found during the avian monitoring studies. The bat study was conducted in 2001 and 2002. ("Bat Interactions with Wind Turbines at the Buffalo Ridge, Minnesota Wind Resource Area," November 2003). The overall conclusion is that bat activity at turbines and the numbers of bat fatalities do not share a statistical relationship. Bat collisions were found to be very rare, given the amount of bat activity documented at the turbines. Most fatalities involved migrating bats, a wind-plant related mortality "is possibly not sufficient to cause significant, large-scale population declines." (p. 61)
65. Mitigation measures are also prescribed in the site permit and include but are not limited to: a) a pre-construction inventory of existing biological resources, native prairie, state listed and threatened species and wetlands in the Project area; b) landowner approval will be negotiated prior to any removal of trees during construction; c) sound water and soil conservation practices will be implemented during construction and operation of the Project to protect topsoil and adjacent resources and to minimize soil erosion. See site permit conditions III.B.9, 11, 12, 14, III.C.4-6 and III.D.1.

## **Vegetation**

66. Removal of groves of trees or shelterbelts will be minimized. Native prairie is not known to be present at the site; however, it will be avoided if encountered. The site permit, at

III.C.6. provides for preparation of a prairie protection and management plan if prairie remnants are discovered on the site.

## **Soils**

67. Construction of the wind turbines and access roads increases the potential for erosion during construction and converts small amounts of farmland to industrial use. The site permit at III.B.9. requires a soil erosion and sediment control plan, which can be the same as the Storm Water Pollution Prevention Plan (SWPPP) submitted to the MPCA for the Permittee's storm water runoff permit application. See site permit at III.B.9.

## **Wetlands**

68. No towers, access roads or utility lines will be located in or will cross Public Waters or Public Waters Wetlands, unless permitted by the DNR. See site permit at III.C.5.
69. The Permittee will work with landowners and drain tile contractors to determine or predict the location of drain tile lines. Impacts to drain tile will be avoided. Any impacts to drain tile will be promptly repaired by the Permittee, unless otherwise negotiated with the landowner. See site permit at III.A.6.

## **Future Development and Expansion**

70. While large-scale wind energy projects have occurred elsewhere (California and Iowa), little systematic study of the cumulative impact has occurred. Research on the total impact of many different projects in one area has not occurred. DOC EFP staff continues to monitor for cumulative impacts and issues related to wind energy development.
71. The PUC and DOC anticipate more LWECS site permit applications under Minnesota Statutes Chapter 216F. The PUC is responsible for siting of LWECS "in an orderly manner compatible with environmental preservation, sustainable development, and the efficient use of resources." Minnesota Statute 216F.03.
72. Minnesota Statute 216E.03, subd. 7, requires consideration of design options that might minimize adverse environmental impacts. Turbines must also be sited to minimize noise and aesthetic impacts. Buffers between strings of turbines are designed to protect the turbines' production potential. The site permit also provides for buffers between adjacent wind energy projects to protect production potential. See site permit at III.C.1.
73. The location and spacing of the turbines are critical to the issues of orderly development and the efficient use of wind resources. Turbines are likely to be located in the best winds, and the spacing dictates, among other factors, how much land area a project occupies.
74. One efficiency issue is the loss of wind in the wake of turbines. Wind flow behind the turbine is not as fast and is more turbulent than the free-flowing wind. This condition persists for some distance behind the turbine as normal wind flow is gradually restored. If a turbine is spaced too close downwind of another turbine, it produces less energy and

is less cost-effective. This is the wake loss effect. If the spacing is too far, wind resources are wasted and project footprints on the land is unnecessarily large.

75. For this Project, turbine spacing will maximize use of the available wind resources and minimize wake and array losses within the topographical context of the site. The objective is to capture the most net energy possible from the best available wind resource. Given the predominant southerly and northwesterly winds at this site, the spacing between turbines will be greatest in the north-south direction for the Moraine Wind II Project. (Exhibit 1).

### **Maintenance**

76. Maintenance of the turbines will be on a scheduled, rotating basis. Additional unscheduled maintenance will be conducted on an as needed basis. Maintenance on the interconnection points will be coordinated with Xcel Energy. The Moraine Wind II Project will be staffed with site technicians and a wind plant supervisor. Moraine Wind II, LLC, may build or expand an existing a facility to house the operation and maintenance efforts for the Project. (Exhibit 1).

### **Site Restoration**

77. Decommissioning and site restoration activities will include (1) removal of all turbines and towers; (2) removal of all pad mounted transformers; (3) removal of all above-ground distribution facilities; (4) removal of foundations to a depth of four (4) feet below grade; and (5) removal of surface road material and restoration of the roads and turbine sites to previous conditions to the extent feasible. (Exhibit 1). See site permit at III.G.1-3.

### **Decommissioning Economics**

78. Moraine Wind II, LLC, will be responsible for all costs to decommission the Project and associated facilities. Decommissioning will be completed within 18 months from the time this site permit expires or the facility ceases to operate whichever is earlier. (Exhibit 1). See site permit at III.G.
79. The site permit requires Moraine Wind II, LLC, to submit a decommissioning plan to the PUC prior to construction describing how the Permittee will ensure that the resources are available to pay for decommissioning the Project at the appropriate time. The PUC may request the Permittee file a report at anytime describing how it is fulfilling this obligation. See site permit at III.G.

### **Site Permit Conditions**

80. Nearly all of the conditions contained in the site permit were established as part of the site permit proceedings of other wind turbine projects permitted by the Environmental Quality Board and the Public Utilities Commission. Minor changes that provide for clarifications of the draft site permit conditions have been made.

81. The proposed Moraine Wind II, LLC, Project shall meet the site permit setback requirements from existing wind turbines and lands to which it does not hold wind development rights.
82. The site permit contains conditions that apply to site preparation, construction, cleanup, restoration, operation, maintenance, abandonment, decommissioning and all other aspects of the Project.

Based on the foregoing findings, the Minnesota Public Utilities Commission makes the following:

### **CONCLUSIONS OF LAW**

1. Any of the foregoing findings, which more properly should be designated as conclusions, are hereby adopted as such.
2. The Moraine Wind II, LLC, Application for a site permit was properly filed and noticed as required by Minnesota Statute 216F.04 and Minnesota Rule 4401.0460 subp. 2 and 4401.0550 subp. 2.
3. The Minnesota Public Utilities Commission has afforded all interested persons an opportunity to participate in the development of the site permit and has complied with all applicable procedural requirements of Minnesota Statutes Chapter 216F and Minnesota Rules Chapter 4401.
4. The Commission concludes that the 3 RD east-west and 5 RD north-south wind access buffer set back adequately protects the wind and property rights of persons outside the Project boundary and/or persons within the Project boundary but not participating the Moraine Wind II, LLC, Project.
5. The Minnesota Public Utilities Commission has jurisdiction under Minnesota Statutes section 216F.04 over the site permit applied for by Moraine Wind II, LLC.
6. The Moraine Wind II, LLC, Project will not create significant human or environmental impacts and is compatible with environmental preservation, sustainable development, and the efficient use of resources.
7. The Minnesota Public Utilities Commission has the authority under Minnesota Statutes Chapter 216F and Minnesota Rules Chapter 4401 to establish conditions in site permits relating to site layout, construction, operation and maintenance of an LWECS. The conditions contained in the site permit issued to Moraine Wind II, LLC, are appropriate, necessary and within the Minnesota Public Utilities Commission's authority.

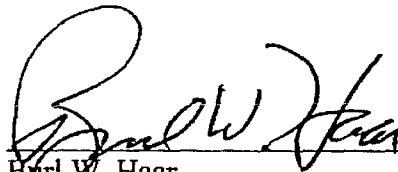
Based on the foregoing Findings of Fact and Conclusions of Law, the Minnesota Public Utilities Commission issues the following:

## ORDER

The attached site permit is hereby issued to Moraine Wind II, LLC, for up to a 49.9 MW Large Wind Energy Conversion System in Pipestone and Murray counties, Minnesota. The site permit issued by the PUC authorizes Moraine Wind II, LLC, to construct and operate the proposed LWECS and associated facilities in accordance with the conditions contained in the site permit and in compliance with Minnesota Statutes Chapter 216F and with Minnesota Rules Chapter 4401.

Approved and adopted this 31<sup>st</sup> day of July, 2007.

BY ORDER OF THE COMMISSION

A handwritten signature in black ink, appearing to read "Burl W. Haar", is written over a horizontal line.

Burl W. Haar,  
Executive Secretary

(SEAL)

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